FADING TEACHER PROMPTS FROM PEER-INITIATION INTERVENTIONS FOR YOUNG CHILDREN WITH DISABILITIES

SAMUEL L. ODOM

VANDERBILT UNIVERSITY

LYNETTE K. CHANDLER

SOUTHERN ILLINOIS UNIVERSITY

MICHAELENE OSTROSKY

UNIVERSITY OF ILLINOIS

AND

SCOTT R. MCCONNELL AND SUSAN REANEY

UNIVERSITY OF MINNESOTA

This study examined a system for fading teacher prompts to children who served as peers in peer-initiation interventions for young children with disabilities. A teacher taught peers to direct social initiations to children with disabilities, provided verbal prompts for those initiations, and introduced a system that provided peers with visual feedback about the social interactions of the children with disabilities. She then systematically withdrew the verbal prompts to peers, and subsequently faded the visual feedback system. Peer initiations increased when the intervention began and resulted in increases in social interaction for the children with disabilities. As the teacher systematically faded the prompts and visual feedback to the peers, social interaction continued at the levels found during intervention and was maintained during a short maintenance period.

DESCRIPTORS: preschool children, social interaction, teacher prompts

For many young children with disabilities, the absence of basic social interaction skills limits their active participation in peer-group social interaction. In fact, researchers have recommended that development of peer-related social competence become the central focus of any general early intervention program for young children with disabilities (Guralnick, 1990; Strain, 1990). Peer-initiation intervention is one strategy for promoting social interaction between children with disabilities and more socially competent peers (Strain & Odom, 1986).

In peer-initiation interventions, socially competent peers are taught to make specific social initiations to children with disabilities in order to engage them in extended, positive social interactions. The rationales for placing peers in that role are that (a) within the broader context (e.g., play materials or activities), peers are the natural discriminative stimuli for positive social interaction for the target children; (b) peers may be more effective than teachers in promoting generalization and maintenance because they are active participants in natural settings (Mathur & Rutherford, 1991); and (c) teacher attention or praise used to reinforce the social interactions of target children may disrupt ongoing peer interactions (Strain & Fox, 1981).

Procedural dimensions of peer-initiation interventions have varied across studies. In early demonstrations of this intervention strategy, researchers taught peers to make social initiations to target children but did not prompt peers to deliver the initiations (Strain, 1977; Strain, Shores, & Timm,

1977). However, in recent applications of the intervention with young children with disabilities, teachers have verbally prompted peers to make social initiations to target children and/or have rewarded the peers during or after the play session if the peers or target children reached a criterion level of social interaction (e.g., Goldstein & Ferrell, 1987; Hendrickson, Strain, Tremblay, & Shores, 1982; Odom, Strain, Karger, & Smith, 1986; Strain & Odom, 1986).

Teacher prompts and reinforcers are designed to encourage peers to continue making social initiations even when the target children do not initially respond to such social overtures. However, it is possible that peers may become dependent on teacher support for making social initiations. In the study by Odom, Hoyson, Jamieson, and Strain (1985), 30% to 40% of the peer initiations were prompted by the teacher; when prompts were withdrawn, social initiations and interactions decreased substantially. Results reported by Goldstein and Wickstrom (1986) suggest a similar relationship between teacher prompts and social initiation during intervention. In several studies, researchers have attempted to fade teacher prompts. Kohler, Strain, Maretsky, and DeCasare (1990) employed a group contingency and peer support strategy for promoting peer interaction and found that teacher prompts could be withdrawn. However, at the end of their study, teachers continued to use a group contingency reinforcement system to support peer interaction. Using a "say-do" correspondence training approach, Sainato, Goldstein, and Strain (1992) reduced teacher prompts to peers, but at the end of their study, low levels of teacher prompts and teacher reinforcement for verbally reported correspondence were still being provided. Similarly, Odom and Watts (1991) used a correspondence training and visual feedback system (CTVF) to support peer initiations in the absence of teacher prompts. Again, the CTVF system was not faded systematically by the end of the study, and when this system was withdrawn abruptly, peer initiations and social interaction of the target children decreased to baseline levels.

To fade verbal prompts and reinforcement in a teacher-mediated intervention with socially withdrawn preschoolers, Timm, Strain, and Eller (1979) used a response-dependent fading strategy. This strategy resulted in decreased levels of teacher prompts, but it was unclear from their report whether teacher prompts or reinforcement were eliminated completely. In a replication of this study, Fox, Shores, Lindeman, and Strain (1986) also used a response-dependent technique to reduce teacher prompts and reinforcement, but at the end of the fading phase a low level of teacher prompts was still provided. Also, during the follow-up phase, in which prompts were completely eliminated, social initiations and interactions of target children became variable and occurred less frequently than during intervention.

In the prompt-reduction studies noted above, peers or target children continued to receive some level of teacher prompting or reinforcement at the end of the intervention period. If maintenance and generalization of treatment effects are to occur, then natural stimuli must serve as the setting events and discriminative stimuli for peer initiations, and the interactions themselves must function as reinforcers (Baer & Wolf, 1970; Mathur & Rutherford, 1991; McConnell, 1987; Odom & Strain, 1986). To accomplish this transfer from teacher support to natural stimuli and reinforcers, intervention procedures must be faded entirely.

This study examined the effects of a strategy for systematically fading verbal prompts to peers in peer-initiation interventions (in the absence of teacher reinforcement) and to monitor the effects of this fading package on the social interactions of young children with disabilities. In this study, the teacher taught peers specific social initiations for engaging preschool children with disabilities, and prompted frequently during the early phases of the intervention. To fade verbal prompts, the teacher provided visual feedback to peers regarding their social interactions with target children, faded the verbal prompts, and then faded the feedback system. This study extended the research of Sainato et al. (1992) and Odom and Watts (1991) in that it employed a visual feedback system that gave the peers the opportunity to monitor their performance

Table 1
Demographic Characteristics of the Target Children

Name	Chrono-logical age (months)	Developmental information	Behavioral description
Quenton	52	Boehm Test of Basic Concepts (BTBC) = 1 percentile California Preschool Social Competency (CPSCS) = 36 percentile	Typically engaged in isolated or parallel play and rarely initiated or responded to peers.
Julie	54	BTBC = 1 percentile Developmental Profile II = 53 IQ (equiv.) CPSCS = 1 percentile Vineland Adaptive Behavior Scale (VABS) communication = 13 months	Rarely approached peers and received few initiations from her classmates. She exhibited limited play skills and often mouthed toys.
Linda	65	Peabody Picture Vocabulary Test—Revised (PPVT—R) = 30 months Preschool Language Scale (PLS) = 32 months (language age) CPSCS = <1 percentile	Exhibited moderate toy play skills and received few initiations from peers. Responded to peer initiations and frequently initiated to adults in her classroom but rarely to peers.
Sandra	51	PPVT + Expressive one-word picture vocabulary test = no basal established CPSCS = <1 percentile	Received few initiations from peers and rarely initiated to them. Responded to peers' initiations. Displayed poor toy play skills.
Lee	59	BTBC = 3 percentile PPVT—R = 33 months Goldman-Fristoe Test of Articulation = severe articulation delay PLS = significant delay in expressive language skills and mild/moderate delay in receptive language skills CPSCS = 18 percentile	Sometimes she approached peers but experienced difficulty in sharing and cooperative play. Peer interactions were primarily aversive and sometimes aggressive.
Pete	57	Brigance = 12 months (cognitive) PLS Language age = 23¼ months CPSCS = <1 percentile	Exhibited very poor toy play skills, usually mouthed, scattered or played with toys in a self-stimulatory manner. Seldom received initiations from peers and was never observed to initiate or respond to peers before the intervention.

as prompts were faded, but the system did not include teacher reinforcement. In addition, it extended the work of Timm et al. (1979) and Fox et al. (1986) by using a systematic fading procedure to withdraw all teacher verbal prompts.

METHOD

Participants

Six preschool children with disabilities served as target children. They were enrolled in two special education classrooms in middle Tennessee. The de-mographic information for each child appears in Table 1. All children met the Tennessee criteria for qualifying for special education. Four of the children were classified as having mental retardation (Julie, Sandra, Lee, and Pete), 1 child was diagnosed as being at high risk and having borderline levels of mental retardation (Quenton), and 1 child was classified as language delayed (Linda). All children were nominated as targets by the classroom teacher because of their limited interactions with peers; the children's level of peer interaction was subsequently confirmed through direct observations

by the research staff. Quenton, Julie, and Linda were in one classroom, and the other target children were in the second classroom.

Ten children without disabilities (6 girls and 4 boys) from seven kindergarten classes participated as peers in this study. These children were nominated for participation by their kindergarten teacher based upon the following criteria: age-appropriate interaction with kindergarten peers, ability to follow teacher directions, good academic record, and expressed desire to participate in the study. All peers were 5 years old when the study began.

Six nontarget preschoolers with disabilities also participated in the structured play groups, described below, but were not the focus of this study. The nontarget children were chosen because they exhibited some social interaction with peers in the special education classroom (i.e., were not social isolates), and the teacher suggested they could benefit from additional training. Each of the nontarget children exhibited vocal language, although one child consistently used gestures and/or signs to communicate.

Setting

Each phase took place during structured play activities in the target children's classrooms. Twenty activities were selected for the structured play groups, based upon previous research that indicated their usefulness as settings for intervention (Odom & Strain, 1984). The activities consisted primarily of fine motor (e.g., blocks, puzzles, Mr. Potato Head®) and sociodramatic (e.g., birthday party, fishing, cooking) play themes. The activities were implemented initially in an arbitrary order, and when all had been implemented once, they were repeated in the same order. Descriptions of each activity are provided by Ostrosky, Chandler, Odom, McConnell, and Peterson (1991). The activities lasted 8 to 10 min each day.

Play groups were composed of a target child, a nontarget child with disabilities, and 2 to 3 kindergarten peers. Each day the kindergarten peers came to the special education classroom to participate in the structured play activities. A research

assistant with 5 years of experience as a special education teacher served as the teacher.

Dependent Variables

Each day, observers collected a 5-min sample of each target child's social interactions in the structured play setting. These samples began approximately 1 min after the children began playing. The observers used a 6-s continuous-interval recording system adapted from McConnell, Sisson, and Sandler (1984) to assess the children's social interactions. The observers recorded social behavior that a target child directed toward peers and that peers directed to the target child. Observers were cued to change intervals by an audiotape and earphones. Observers were trained to a .75 (i.e., kappa) criterion before the study began. The following categories were coded.

Initiations. Any verbal or gestural behavior the target child directed to a peer or the peer directed to a target child that was not preceded by a social behavior from the same peer in the same interval.

Responses. Any verbal or gestural behaviors directed toward an initiating peer that occurred within the same interval or succeeding interval in which an initiation is scored.

Teacher prompts. Corrective or directive attention the teacher provided to the target child or peer for engaging in social interaction.

Teacher praise. Positive verbal or nonverbal attention the teacher directed to a target child or peer for engaging in social interaction.

Social interaction. A reciprocal exchange of social behavior, represented by an initiation and a positive response that occurred within 3 s (in the same interval or subsequent interval), or an ongoing social interaction that continued in subsequent intervals.

Interobserver Agreement

Interobserver agreement was collected by having two observers simultaneously observe and record the behavior of the children and teachers for 5-min sessions. Agreement was defined as both observers coding the same behavior as occurring within the

same interval. Agreement was collected for 20% of the total intervals, distributed evenly across children and phases. As Hartmann (1982) recommended, both interval-level (i.e., agreement on behavior occurring within an interval) and session-level (i.e., agreement on number of behaviors recorded for a session) agreements were computed. For interval-level agreement, a kappa coefficient was used because it corrected for chance agreement (Bakeman & Gottman, 1986). Means and ranges for kappa coefficients were .73 (.42 to 1.0) for initiations, .69 (.41 to .90) for social interactions, and .74 (.35 to 1.0) for teacher prompts. Hartmann (1982), Bakeman and Gottman (1986), and Fleiss (1981) have noted that kappa coefficients of .60 are considered acceptable indices of interobserver agreement. Session-level agreement was analyzed using Pearson product moment correlation. The coefficients were .92 for initiations, .94 for social interactions, and .92 for teacher prompts. Kappa and correlation coefficients were computed only for sessions containing nonzero frequencies. Interobserver agreement was not computed for teacher praise because it was never observed during the interobserver agreement sessions.

Experimental Design

A combined sequential and partial withdrawal design (Kazdin, 1982) was employed. In this design, the peer-initiation intervention was first implemented with 3 children in one classroom, and was subsequently implemented in a second classroom in a staggered, multiple baseline fashion. Next, the visual feedback system was introduced with 3 students and again later implemented with the 3 students from the second classroom. Finally, teacher verbal prompts and then visual feedback were faded in a sequential and partial withdrawal manner (Kazdin, 1982). This fading process began in the first classroom, and when effects were maintained, was then implemented in the second classroom. The specific phases of the intervention were baseline, peer training and teacher prompting, visual feedback and teacher prompting, fade teacher prompts, fade visual feedback, and maintenance.

Procedure

Baseline. During baseline, children accompanied the teacher to the structured play activities. At the beginning of the activity, the teacher introduced the activity for the day (e.g., described the toys, talked about how the children could play with the materials) and then let the children play. The teacher did not provide prompts or praise for interaction and intervened only when necessary to keep order.

Peer training and teacher prompts. Peers participated in five daily small-group training sessions in which they learned five specific initiations for promoting social interactions of target children (i.e., share, share request, play organizer, assistance, and persistence). These lessons are described by Ostrosky et al. (1991). Specifically, the teacher reviewed behaviors learned in the previous lessons, described the new behavior to be learned, solicited from the peers verbal responses describing the behavior, modeled multiple positive and negative examples of the new behavior, and had the peers practice the new behavior. These lessons were approximately 20 min long and occurred at least 1 hr before the structured play activities.

Beginning on the same day as the peer training, the teacher met with the peers briefly before the structured play activity to review the initiations they had learned and to ask them to think of ways they could "get their friend to play with them" in the activity. The target children then joined the group, and the teacher arranged the group in dyads (i.e., the target child was always paired with 1 or 2 nondisabled peers). She then introduced the activity and provided verbal prompts approximately every 30 s if a social interaction had not occurred. The teacher repeated the prompt if the peer did not initiate a social interaction with the target child. Teacher prompts were specific in that they specified the behavior that the peer was to direct to the target child. The prompts were designed to produce the social interaction skill introduced during the training session or any of the skills learned previously, depending on the context.

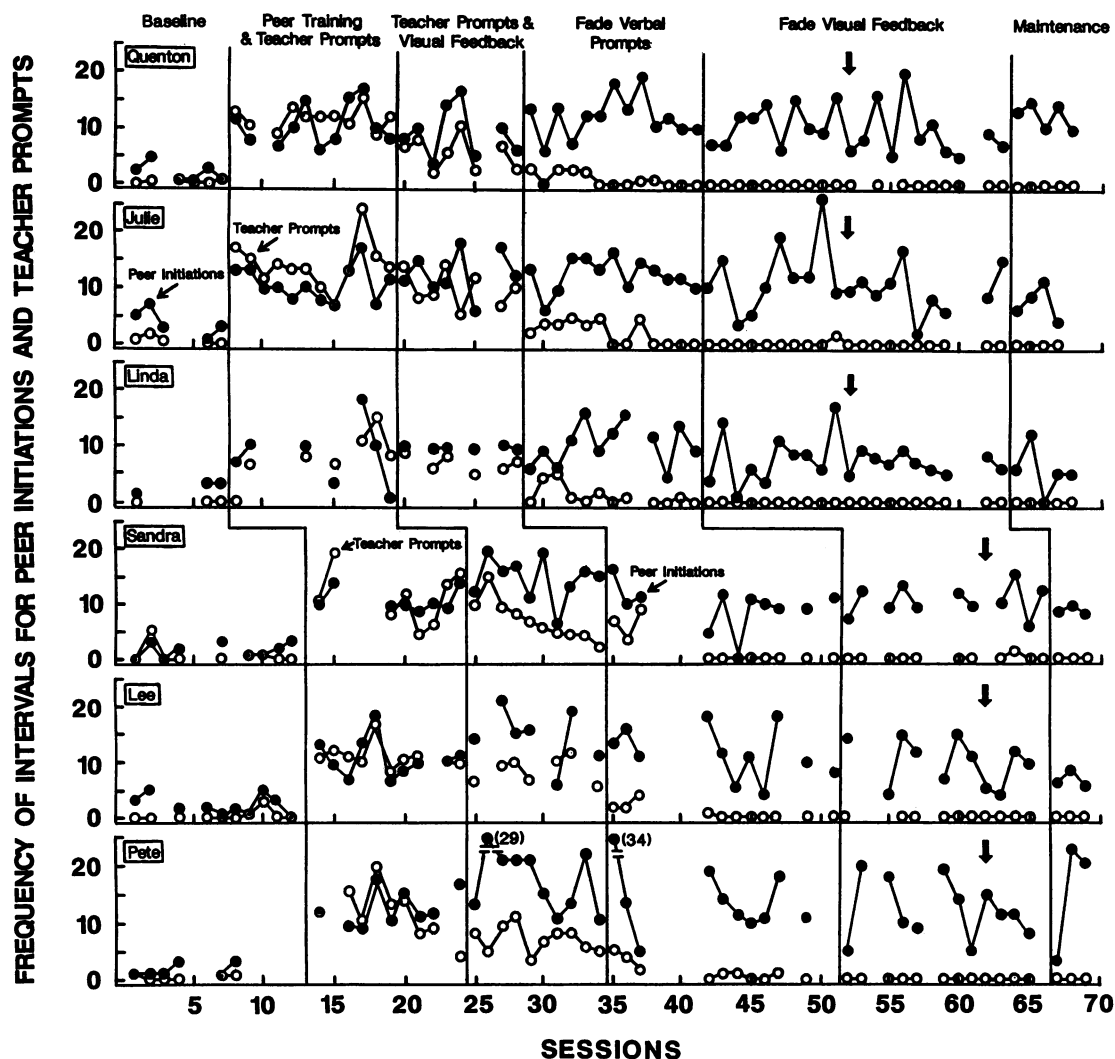*Teacher prompts and visual feedback.* Visual

Figure 1.   Frequency of intervals in which peer initiations to target children and teacher prompts to peers were recorded. The vertical arrows indicate the day on which visual feedback cards were discontinued.

feedback was provided to the peers by a "happy face" card attached to a clipboard. Six circles were drawn on a card (5 in. by 8 in.) for the peers of all the children except Pete. Because of Pete's relatively low frequency of interaction during the second phase of the study, the number of circles was reduced to four for his peers. Each time the peer made an initiation and the target child responded, the teacher filled in a circle with a happy face. If all the happy face circles were filled, the teacher drew others on the card to indicate that an interaction had occurred. At the end of the session, the

teacher reviewed the happy face card with the peers, but she did not provide positive consequences for obtaining a criterion level of happy faces. During this phase, the teacher continued to provide verbal prompts to the peers.

Fade verbal prompts. In this phase, the teacher began using only general prompts (i.e., general reminders to get their friend to play rather than telling them specifically what to do). Also, the teacher began reducing the frequency of her prompts to the peers while still providing visual feedback. The teacher continued to discuss social initiations
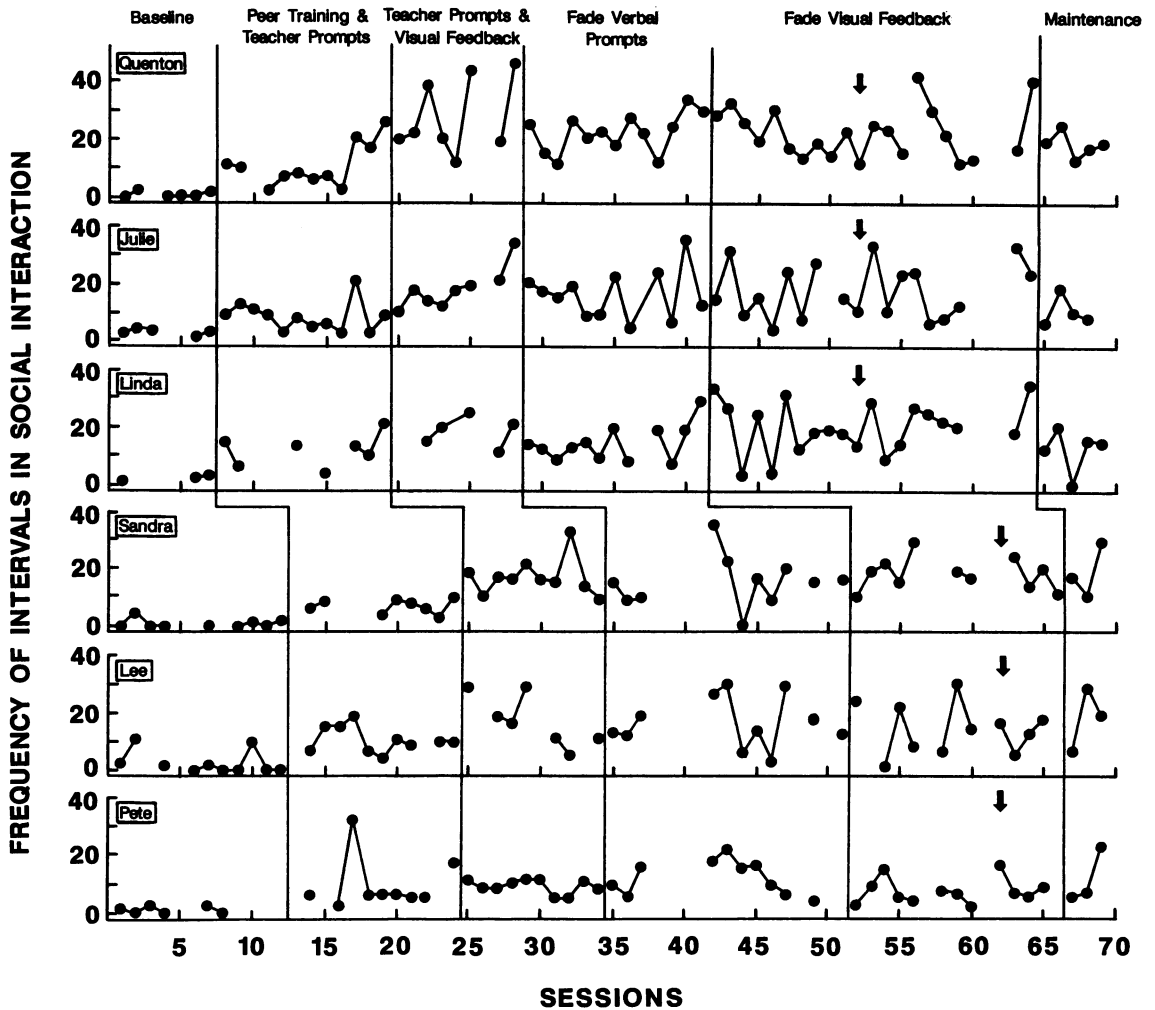
Figure 2. Frequency of intervals in which target children's social interaction was recorded. The vertical arrows indicate the day on which visual feedback cards were discontinued.

with the peers before the play activity and reviewed the visual feedback after the activity.

Fade visual feedback. As in the previous phase, the teacher discussed the happy face cards with the peers before the intervention. During play, she turned the visual feedback card around. She still recorded happy faces, but the peer could not see them. Again, at the end of the play session, she reviewed the number of happy faces achieved after the intervention.

On the day indicated by the arrow on Figures 1 and 2, the teacher stopped using the feedback card and instructed the peers to "keep the happy faces in their head." She said she would be counting the happy faces in "her head also." At the end of the activity, the teacher continued to review the peer's initiations and compared in a general way (e.g., a lot, a little) the number of happy faces the peers had counted with the number she had counted.

Maintenance. At the beginning of this phase, the teacher told the peers she would not be counting happy faces. She introduced the activity, as in baseline, but did not discuss initiation behaviors with the peers. She sat outside the group and refrained from directing her attention to specific children.

Table 2

Mean Intervals per Session for Peer Initiation, Social Interaction, and Teacher Prompts

	Condition					
	Baseline	Peer training and teacher prompt	Teacher prompt and visual feedback	Fade verbal prompt	Fade visual feedback	Maintenance
Peer initiation						
Quenton	2.1	10.6	9.1	12.1	10.0	12.4
Julie	3.8	10.7	12.5	12.2	10.9	7.3
Linda	2.3	8.4	9.3	10.3	7.4	5.6
Sandra	1.7	10.4	16.0	10.8	10.4	8.3
Lee	2.4	10.5	16.7	11.9	9.9	6.7
Pete	1.7	12.6	21.0	15.3	12.3	15.7
Social interaction						
Quenton	0.7	10.7	27.8	22.2	22.3	18.8
Julie	3.2	8.3	18.1	15.8	17.3	11.0
Linda	2.0	11.9	22.9	14.5	20.0	14.0
Sandra	0.8	6.7	15.3	15.8	18.2	18.7
Lee	2.6	11.1	21.3	16.1	14.3	18.0
Pete	1.2	9.6	9.3	10.6	20.0	11.3
Teacher prompts to peers						
Quenton	0.5	11.9	5.9	1.0	0.0	0.0
Julie	0.8	13.9	9.8	1.8	0.0	0.0
Linda	0.0	8.0	6.8	1.2	0.0	0.0
Sandra	0.8	10.9	10.5	2.8	0.1	0.0
Lee	0.4	11.1	8.7	2.9	0.0	0.0
Pete	0.5	11.8	8.3	3.2	0.0	0.0

However, she did intervene if noise from the group disturbed the rest of the class (which rarely occurred). At the end of the session, she thanked all the children for attending the group, but as usual, she did not differentially reinforce reports of initiations or interactions.

RESULTS

Teacher Prompts

As depicted in Figure 1 and Table 2, teacher prompts to peers occurred very infrequently during baseline. When the peer training/teacher prompts phase began, prompts increased substantially for all peers and generally remained at the same level throughout the teacher prompts and feedback phase of the study. At the beginning of the fade teacher prompts phase, prompts began to decrease and were eliminated by the end of the phase. Teacher prompts were inadvertently provided to 3 of the target children during the intervention. Pete, Lee, and Quenton each received one teacher prompt on two separate days. Although teacher praise occurred infrequently throughout the study, there were several intervals in which the teacher inadvertently provided praise. On 1 day, the teacher provided praise to Lee and on another day to Lee's peer. Also, on 1 day the teacher provided praise three times to Julie.

Peer Initiations

Peer initiations occurred infrequently during baseline but increased substantially when peer training and teacher prompts began (Figure 1, Table 2). When visual feedback was introduced, peer initiations remained stable for most children. As components were systematically withdrawn in the fading phases, peer initiations remained at the same

level. Similarly, peer initiations during the maintenance phase remained at levels similar to those in previous phases.

Social Interaction of Target Children

The frequency of intervals in which target children were involved in social interaction is shown in Figure 2 and Table 2. During baseline, social interaction occurred very infrequently. When peer training and teacher prompting began, there were modest increases in the frequency of intervals of social interaction, with increases becoming more marked toward the end of the phase for Quenton and Linda. However, as the peer initiations continued in the teacher prompts and visual feedback phase, continued increases in social interaction occurred for Quenton, Julie, Linda, Sandra, and Lee. For all components of the fading phases, social interaction increased or remained stable above baseline levels for all children. Although variability existed in this phase, 5 of the 6 children engaged in social interaction substantially above baseline levels, with Pete being the notable exception. Pete's performance was above baseline, but was still modest. During the last phase, the children maintained the levels of social interaction reached in the previous fading phase.

DISCUSSION

A standard peer-initiation intervention was implemented for 6 children with disabilities and resulted in increases in the children's social interactions with peers. During the early phases of the study, teachers verbally prompted peers to direct social initiations to the target children. At this time, a visual feedback system was introduced to allow peers the opportunity to monitor their levels of social interaction as the teacher faded her verbal prompts. Next, this visual feedback card was faded by first turning it around and delaying feedback until the end of the session, and then withdrawing it and asking peers to "keep the happy faces in your head." During a short-term maintenance phase, children continued to interact at the levels found during the earlier phases of the intervention. Thus,

we extended the previous literature on prompt fading in social interaction interventions for young children with disabilities (Fox et al., 1986; Odom & Watts, 1991; Sainato et al., 1992; Timm et al., 1979) by employing a visual feedback system, exclusive of adult reinforcement, to support peer initiations as teacher prompts were faded completely; then the visual feedback system was faded.

A combined sequential and partial withdrawal design was used. With this design, one can demonstrate that intervention procedures are faded without loss of treatment effects, but one cannot ascertain from this design if any single component was more important than another in the fading process (Kazdin 1982). The sequential reduction of teacher prompts across the two tiers of three sets of peers provided evidence of experimental control for fading teacher prompts. Previous research (Hendrickson et al., 1982; Odom et al., 1985, 1986; Odom & Strain, 1986) has suggested that peer initiations and social interactions decline if withdrawal of teacher prompts alone had occurred. However, experimental control for the visual feedback system was not specifically demonstrated. Future research might examine the relative effects of each component, potentially by inserting brief baseline probes between phases in which components are faded or by measuring children's behavior in concurrent baseline settings (cf. Fowler, Dougherty, Kirby, & Kohler, 1986).

Although this study did not provide an experimental analysis of the specific mechanisms supporting maintenance of treatment effects, our procedure was based on the assumption that stimulus control of peer initiations would transfer from the *target child and training and teacher prompts* to the *target child and visual feedback* to the *target child*. The data are consistent with this interpretation, although competing explanations for this effect cannot be ruled out. For example, one cannot discuss stimulus control without examining the reinforcing stimuli that support social interaction. Undoubtedly, the peer interactions became more reinforcing as the intervention proceeded; otherwise, there would be no reinforcers with which the discriminative stimuli could be linked. Indeed,

our impression was that the interactions became clearly more positive and friendly as the intervention continued for 5 of the 6 children. Pete, the exception, was more difficult to engage in playful interaction, in part because of his limited play skills. Also, he would sometimes drool on the toys, which made peers reluctant to initiate play.

During the baseline condition, the teacher provided no prompts or reinforcers. Such conditions are commonly used as baselines for other peer-mediated intervention studies (Hendrickson et al., 1982; Odom et al., 1985; Strain et al., 1977). Such a condition is more structured than might occur in an early childhood education program in which child-directed activities occur most frequently, and is less structured than in a special education classroom in which teacher direction is provided more often. To some extent, the condition represents an environmental arrangement intervention (McEvoy, Odom, & McConnell, 1992), in that the setting events for social interaction exist (Chandler, Fowler, & Lubeck, 1992). The fact that interaction did not occur even when these setting events were arranged suggested that a more intensive intervention was needed for these children with disabilities (Odom & Brown, in press).

Maintenance occurred for a short time. A longer maintenance probe would have been desirable and should be a feature of future investigation (cf. Goldstein & Wickstrom, 1986). In addition to the systematic fading of treatment components, we expect that other stimulus dimensions or setting events (e.g., the play activities, similar peers, structure of the play activities) also supported short-term maintenance. A question that will stimulate future research will be whether social interaction effects will be maintained as these stimulus dimensions change. Clearly, the next step in this program of research is to investigate variables that lead to the long-term maintenance and generalization of treatment effects (Brown & Odom, 1992).

In conclusion, one might speculate on the role of peer-initiation interventions in promoting social competence of preschool children with disabilities. Strain (1991) noted that most social interaction interventions reported in the literature occur for a

relatively small proportion of the time children spend in habilitation programs. In our view, these interventions represent one component of a comprehensive and individualized program for young children with disabilities (Odom & Brown, in press). To obtain effects that generalize to other settings and are maintained across time, a receptive environment must be available; that is, one that provides opportunities for social interactions with socially responsive peers (i.e., in integrated or mainstreamed settings). For children in elementary school, a reading curriculum or specialized reading intervention may lead children to acquire initial reading skills, but we would not expect the children to become fluent and use those skills in their daily lives unless given the opportunity to read a range of literature that they understand and enjoy. Similarly, peer-initiation interventions provide the context for the acquisition of basic social skills. Researchers should now move on to the analysis of variables that extend these skills to the broader social world of young children with disabilities.

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